

IN THE CLAIMS:

Please cancel originally-filed claims 1-8, and add new claims 9-16 as provided below. The listing and status of these claims are provided as follows, on separate sheets:

Claims 1-8 (Cancelled).

9. (New) A fracture prediction device for use with a spot welded portion, comprising:

an input arrangement configured to input at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, or a rotation angle of the joint plates in a tension testing procedure which is at least one of a cross tension testing procedure or a shear tension test procedure at a spot welded joint;

a first calculation arrangement configured to determine a fracture strength parameter of the spot welded portion in at least one of a cross tension or a shear tension from at least one of the material strength, the plate thickness, the nugget diameter of the spot welding, the plate width of the joint, or the rotation angle of the particular joint in the tension testing procedure;

a parameter storage arrangement configured to store the fracture strength parameter by each steel type; and

a second calculation arrangement configured to analyze a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture prediction formula in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

10. (New) A fracture prediction device provided for a spot welded portion, comprising:

an input arrangement configured to input at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, or a rotation angle of the joint plates in a tension testing procedure which is at least one of

a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

a first calculation arrangement configured to determine a fracture strength parameter in at least one of a cross tension or a shear tension based on a fracture strength curve of the spot welded portion obtained from at least one of the material strength, the plate thickness, the nugget diameter of the spot welding, the plate width of the joint, or the rotation angle of the particular joint in the tension testing procedure;

a parameter storage arrangement configured to store the fracture strength parameter by each steel type; and

a second calculation arrangement configured to analyze a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture limit line in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

11. (New) A fracture prediction method provided for a spot welded portion, comprising:

inputting at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, or a rotation angle of the particular joint in a tension test which is at least one of a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

determining a fracture strength parameter of the spot welded portion in at least one of a cross tension or a shear tension from at least one of the material strength, the plate thickness, the nugget diameter of the spot welding, the plate width of the joint, or the rotation angle of the joint in the tension testing procedure;

storing the fracture strength parameter by each steel type in a parameter storage arrangement; and

analyzing a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture prediction formula in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

12. (New) A fracture prediction method for a spot welded portion, comprising :

inputting at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, or a rotation angle of the particular joint in a tension test which is at least one of a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

determining a fracture strength parameter of the spot welded portion in at least one of a fracture tension strength curve of a spot welded portion provided from at least one of the material strength, the plate thickness, the nugget diameter of the spot welding, the plate width of the joint, or the rotation angle of the joint in the tension testing procedure;

storing the fracture strength parameter by each steel type in a parameter storage arrangement; and

analyzing a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture limit line in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

13. (New) A software arrangement provided for a fracture prediction of a spot welded portion to design a circuit, comprising:

a first set of instructions which, when executed by a processing arrangement, configure the processing arrangement to determine a fracture strength parameter of the spot welded portion in at least one of a cross tension or a shear tension from at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, and a rotation angle of the particular joint in a tension testing procedure based on at least one of a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

a second set of instructions which, when executed by the processing arrangement, configure the processing arrangement to store the fracture strength parameter by each steel type in a parameter storage arrangement; and

a third set of instructions which, when executed by the processing arrangement, configure the processing arrangement to analyze a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture prediction formula in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

14. (New) A software arrangement provided for a fracture prediction of a spot welded portion to design a circuit, comprising:

a first set of instructions which, when executed by a processing arrangement, configure the processing arrangement to determine a fracture strength parameter of the spot welded portion in at least one of a cross tension or a shear tension a fracture strength curve of the spot welded portion provided from at least one of a

material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a particular joint, and a rotation angle of the particular joint in a tension testing procedure based on at least one of a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

a second set of instructions which, when executed by the processing arrangement, configure the processing arrangement to store the fracture strength parameter by each steel type in a parameter storage arrangement; and

a third set of instructions which, when executed by the processing arrangement, configure the processing arrangement to analyze a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture limit line in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

15. (New) A computer-accessible medium include a computer program thereon which, when executed by a processing arrangement, configures the processing arrangement to perform the procedures comprising:

determining a fracture strength parameter of a spot welded portion in at least one of a cross tension or a shear tension from at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a joint, and a rotation angle of the joint in a tension testing procedure obtained based on at least one of a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

storing the fracture strength parameter by each steel type in a parameter storage arrangement; and

analyzing a fracture of the spot welded portion by providing the fracture strength parameter stored in the parameter storage arrangement into a fracture prediction formula in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.

16. (New) A computer-accessible medium include a computer program thereon which, when executed by a processing arrangement, configures the processing arrangement to perform the procedures comprising:

determining a fracture strength parameter of a spot welded portion in at least one of a cross tension or a shear tension based on a fracture strength curve of the spot welded portion obtained from at least one of a material strength, a plate thickness, a nugget diameter of a spot welding, a plate width of a joint, and a rotation angle of the joint in a tension testing procedure obtained based on a cross tension testing procedure or a shear tension testing procedure at a spot welded joint;

storing the fracture strength parameter by each steel type in a parameter storage arrangement; and

analyzing a fracture of the spot welded portion by installing the fracture strength parameter stored in the parameter storage arrangement into a fracture limit line in which a deformation at a periphery of the spot welding portion is modeled by a finite element procedure.